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SCIENCE NEWS LETTER

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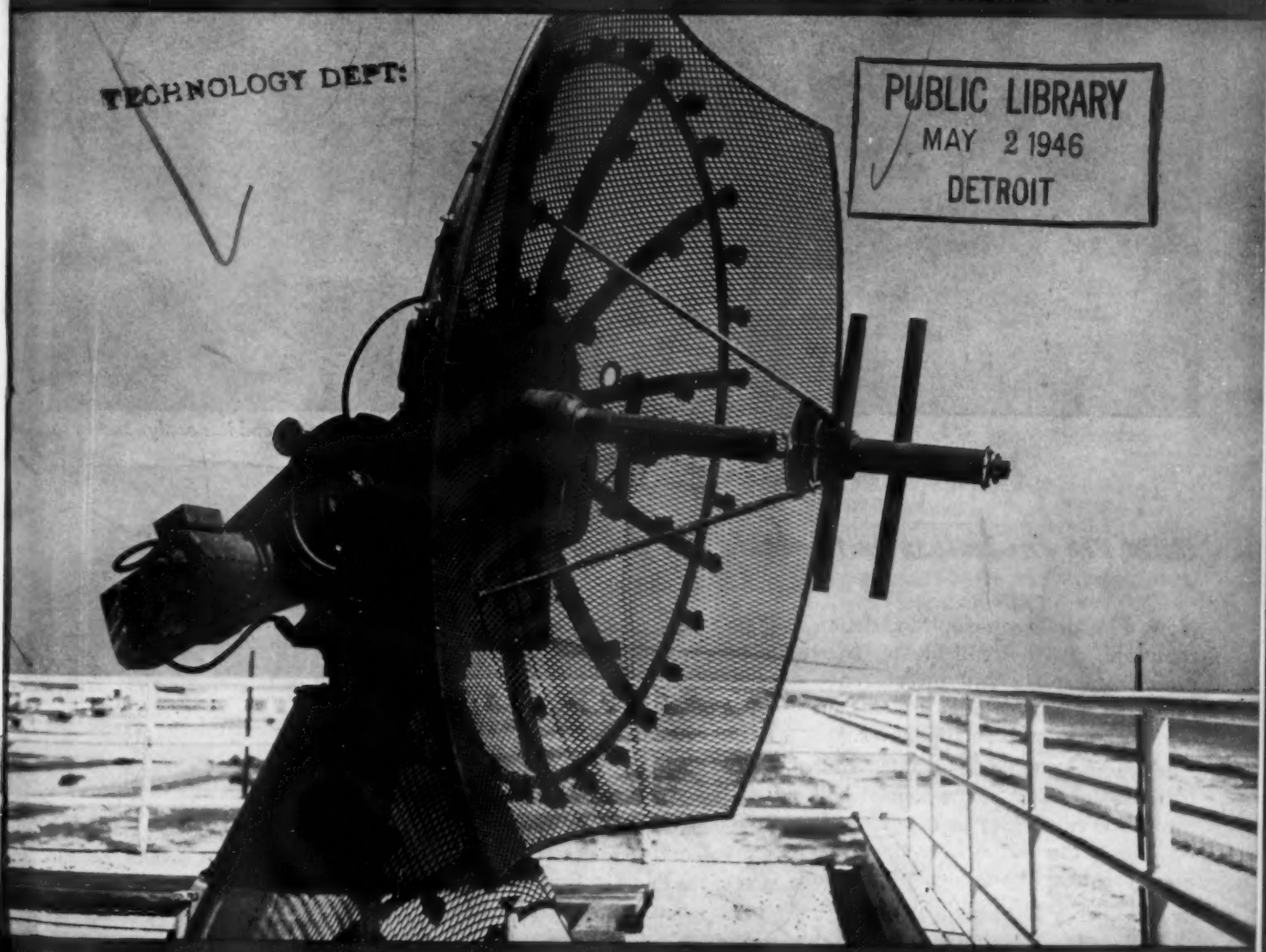

Safe Landings

See Page 261

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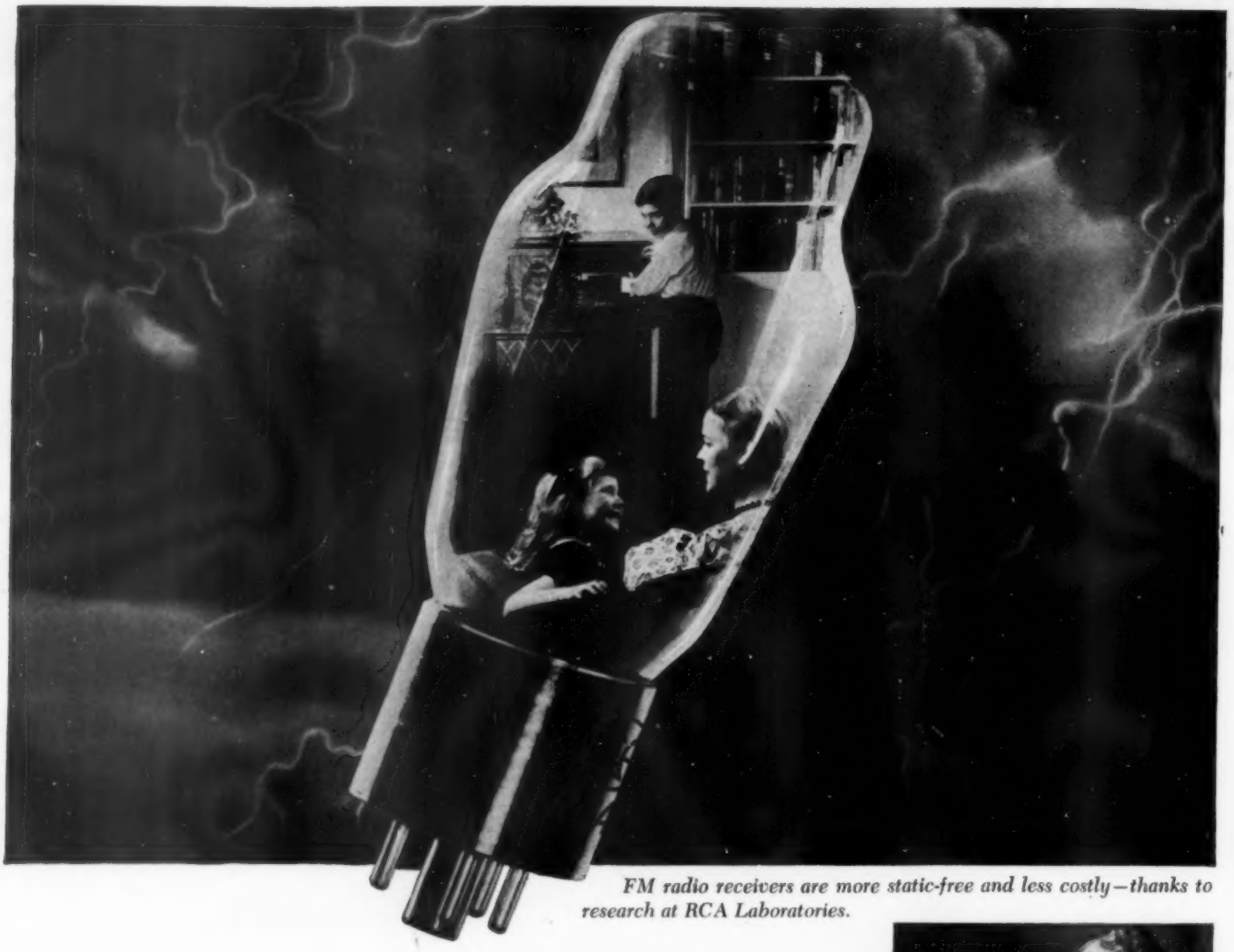

FM radio receivers are more static-free and less costly—thanks to research at RCA Laboratories.

NEW FM - noiseless as the inside of a vacuum tube!

Now, FM, or Frequency Modulation reception, provides still greater freedom from static and interference caused by storms, ignition systems, oil burners, and domestic appliances.

It's radio at its finest—making your living room a part of the concert hall itself. You've no idea of how marvelous music can sound over the radio until you hear the golden perfection of FM reception developed by RCA.

Moreover, through this new RCA development, FM receivers can be made at a cost comparable to that of standard-band broadcast receivers. FM is no longer expensive! "Better things at lower cost" is one of the purposes of RCA Laboratories – where similar research is constantly going into *all* RCA products.

And when you buy anything bearing the RCA Victor name – from a television receiver to a radio tube replacement—you know you are getting one of the finest instruments of its kind that science has yet achieved.

Radio Corporation of America, RCA Building, Radio City, New York 20. Listen to The RCA Victor Show, Sundays, 4:30 P.M., Eastern Standard Time, over the NBC Network.

Stuart William Seeley, Manager of the Industry Service Laboratory, RCA Laboratories Division, perfected this new FM circuit. It not only operates equally effectively with strong or weak stations, but lowers the cost of receivers by eliminating additional tubes and parts that were formerly considered necessary in Frequency Modulation receivers.

RCA **RADIO CORPORATION of AMERICA**

MEDICINE

ACS Serum Explained

It is not a cure for cancer, though it does relieve pain when pain is outstanding symptom. Life-lengthening and other claims due to confusion.

By JANE STAFFORD

► THE ACS SERUM developed by a Soviet scientist has now been given to some 3,500 patients in the United States. The exact figure cannot be given because the final count has not yet been made.

This is the serum you may have read or heard popular accounts of as being able to lengthen human life to 150 years and to cure or prevent a host of diseases such as cancer, arthritis, Hodgkin's disease, infections and mental disease.

ACS is not a cure for cancer. That much can be stated unequivocally, I was told by Dr. Harry Goldblatt, of Western Reserve University School of Medicine, in the course of a search for facts from American scientists who have been studying the serum.

Dr. Goldblatt has prepared the serum and because of "premature publicity and the great demand for it from patients," he has given it to physicians in clinics, hospitals and private practice instead of limiting its use to the relatively few patients he could treat and follow himself. The physicians who were supplied the serum have been sending in their reports and Dr. Goldblatt is now studying them preparatory to publishing the results in a scientific journal.

Besides the fact that the serum does not cure cancer, Dr. Goldblatt has so far found one other fact from the reports he is studying. This is that the serum relieves pain in some cases of cancer when pain is the outstanding symptom and has not been relieved by anything else. The pain, however, is the only thing affected. The patients die just the same.

The hope that ACS would cure or prevent cancer and other diseases and lengthen human life seems to have arisen through confusion over the original reports on the subject. Prof. Alexander A. Bogomolets, director of the Institute of Experimental Biology and Pathology, moved from Kief to Ufa during the war, developed the serum which has the full scientific name of anti-reticular cytotoxic serum. He made it by inoculating horses with an extract of the spleen and bone marrow of human cadavers.

Prof. Bogomolets long had been interested in problems of longevity. He believed that the human life span should be 125 to 150 years. The life span of other animals is five to six times longer than the period of their maturation, so why should not humans live five to six times longer than the period it takes for them to reach maturity? is the way he reasoned.

Studying human physiology, he came to the view that the physiologic system of the connective tissue is the arena in which disease processes develop. Connective tissue, as its name implies, binds together and supports various structures of the body. The layman recognizes connective tissue in bones and cartilage but it is found in many other structures. According to the modern view, it is not merely a skeleton or framework for body structures but has other functions as well.

In this arena of connective tissue is fought the battle between disease germs and the cells of the body that try to devour the invading germs. The cells that engage in the fight make up another system of the body, called the reticulo endothelial system. They are found in various parts of the body but are especially abundant in the liver and spleen.

Keeping the system which takes part in the fight to protect the body against disease and injury at a high level of activity is, in Prof. Bogomolets' view, one of the most important problems in treating disease. His anti-reticular cytotoxic serum was designed for this purpose of stimulating the reactivity of this system.

Believing the system fundamental for protection of the body against assault by germs or other disease-causing agents, Prof. Bogomolets believed his stimulating serum might prove effective against a variety of diseases including some that come as the body ages. It might therefore protect against premature death.

This was presented by Prof. Bogomolets as theory, together with the facts of how the serum was prepared and a report that in minute doses the serum stimulated the reticulo-endothelial system while in large doses it had cytotoxic, or cell poisoning, effects on the system.

NATURE'S ARTISTRY—The ostrich fern, uncoiling from the soil in the spring of the year, presents one of nature's most beautiful designs. When one looks at the graceful coil of the frond of a fern, it is very easy to imagine that some early violin maker in fashioning the shape of the scroll of his instrument must have been a keen observer of the artistry of nature. Photograph by George A. Smith, Quarryville, Pa.

Unfortunately, Prof. Bogomolets' theory seems to have been reported by others as an accomplished fact. He himself did not claim that the serum had cured cancer or lengthened life. In a report I saw, he wrote that he thought it could do this and perhaps much more. But "could," in the sense of "might be able", is not the same as "does" or "has done."

In this same report it was stated that all work in his laboratory had been directed toward producing enough of the serum to meet the demands of the battlefield where Soviet physicians and surgeons found the serum useful in stimulating wound healing and the union of fractured bones.

Other American scientists besides Dr. Goldblatt have been studying the ACS serum. At the University of Utah School of Medicine Drs. Mark Nickerson, Thomas Burns and Arnold M. Cooper made a serum by injecting rabbits with rat spleen and bone marrow. They then tested its effect in stimulating wound healing.

Up to the present time, skin cuts and broken bones did not heal any faster in

animals given the serum than in those without it. However, these scientists do not think their results disprove the stimulating effects of the serum. The reticuloendothelial system of a healthy animal is probably working at its maximum anyway, Dr. Nickerson pointed out to me, so it is not surprising if it cannot be stimulated further. Tests on animals weakened by chronic infection might show a different result.

At the University of Texas at Galveston, Dr. Charles M. Pomerat and associates, Drs. Ludwik Anigstein and Edward H. Frieden, have studied the effect of ACS on cells growing outside the body as well as in the body and have made chemical studies in a search for the chemical nature of the active substance in the serum.

In Los Angeles Dr. Reuben Strauss has found that broken bones produced experimentally in rabbits form stronger, bigger calluses, which means they knit better, when ACS is given to the rabbits.

Science News Letter, April 27, 1946

MEDICINE-CHEMISTRY

Medical Gas Masks

War research on toxic smokes should bring protection against flu, pneumonic plague, hay fever. Smokeless, dustless homes foreseen.

➤ A FILTER, like those in modern gas masks, to protect hay feverites from pollens; another such filter for protection against influenza, pneumonic plague and other air-borne diseases; homes free of smoke and dust—these benefits should come from war research on toxic smokes, or, as the layman would call them, poison gases, Dr. W. H. Rodebush, of the University of Illinois, declared at the meeting of the National Academy of Sciences.

"The modern gas mask," he declared, "is a practically perfect defense against poison gases and smokes which act on the nose, throat and lungs.

"It is without question due to this protection that chemical warfare was not used in World War II," he continued.

World War I gas masks stopped poison gas with a dense bed of fine charcoal particles but the charcoal can not stop smoke. That, Dr. Rodebush explained, is why the blue cross shell became one of the most dreaded and effective weapons used by the Germans. It was filled with a sneeze gas in the form of a smoke. Its particles went right through the charcoal and caused intense irritation of the nose.

Several types of filters which were very effective in removing smoke without at the same time making it more difficult to breathe through the gas mask were developed by the aerosol section of the National Defense Research Committee, Dr. Rodebush reported.

"It is an interesting fact," he said "that most of the very toxic substances which have been suggested for use in future wars are aerosols and, insofar as they depend upon penetration of the respiratory tract for effect, the filter is an adequate protection.

"The principles of filtration which have been studied are likely to prove of great use in civilian life. It should be possible, for example, at small cost to remove all traces of smoke and dust from the air in our homes, thus enormously simplifying the problems of housecleaning and greatly increasing the comfort of breathing for the dwellers therein, particularly in our large cities where so much inconvenience and discomfort is caused by the smoke-laden air.

"It would be neglecting an important part of the Aerosol Section work not to mention the insecticide aerosols, such as DDT. It is an interesting fact that the most efficient insecticides are in the form of aerosols. The reason for this is clear on a little thought. A certain minimum dosage is required to kill the insect. If the insecticide is dispersed in droplets of the proper size in a cloud the insect cannot fly through the cloud without encountering one or more of the particles which are adsorbed through the body surface and prove fatal.

"The aerosol cloud behaves as a fine meshed window screen with this difference. In the screen the meshes must be smaller than the insect's body, but in the cloud one can easily make a statistically exact calculation of the size and dispersion of the cloud so that only a negligible percentage of the insects can fly through the cloud without coming in contact with enough of the droplets to give a toxic dose.

"It is, of course, possible to use a toxic gas to kill insects but it turns out that the gas concentrations required are far greater than are concentrations of aerosols.

"A final mention must be made of the work on the dissipation of fog on landing fields. The problem of landing a plane under conditions of low visibility is of course ultimately to be solved by radar, but this problem was a very serious one in World War II. No simple economical solution was reached on this problem. Air conditioning the atmosphere is a job whose magnitude can be realized if one remembers that one cubic kilometer of air weighs 1,000,000 tons."

Science News Letter, April 27, 1946

Cedar paper containing DDT has been developed as a lining for clothes closets and storage chests to protect against moths and other insects.

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ELECTRONICS

Pilots "Talked Down"

Regardless of weather, radar is able to "see" the plane as it approaches the landing field, and the operator sends complete instructions for landing.

See Front Cover

➤ WHEN "SOUPY" weather makes landing airplanes a dangerous operation, ground radar stations can give the pilot orders that bring him down on an airport runway safely.

Demonstrating its ground controlled approach system to aviation writers at Banana River Naval Air Station in Florida, the Navy showed how pilots can be "talked down" when low visibility makes landing hazardous. A close-up of sensitive radar equipment that records the position of planes above an airport, permitting operators of the equipment to "see" clearly, regardless of weather, and to systematize and control their landing approaches is shown on the front cover of this SCIENCE NEWS LETTER.

Radar at the edge of the landing field follows the plane's maneuvers as a pilot approaches the landing field. Able to "see" the plane as it appears clearly on the radar screen through the thickest fog, the radar operator sends the pilot complete instructions that bring his plane down on the runway to a perfect landing.

Ground controlled approach—GCA to Army and Navy flyers—was developed during the war and first sent into the field by the Armed Forces about November, 1944. Since then, the Navy says that simpler, more reliable and more easily operated equipment has been produced.

On the ground, the GCA installation includes two complete radar sets, six radio transmitters and six receivers. The whole unit is mounted in a trailer behind a four-ton truck.

On the plane, no special equipment is required as the communicating is done via ordinary radio transmitters and receivers. All the pilot has to do, Navy GCA enthusiasts emphasize, is to fly according to the directions given him.

In addition to "talking down" the pilot from the ground, the control system protects him from collisions with radar warnings of any other aircraft in the vicinity.

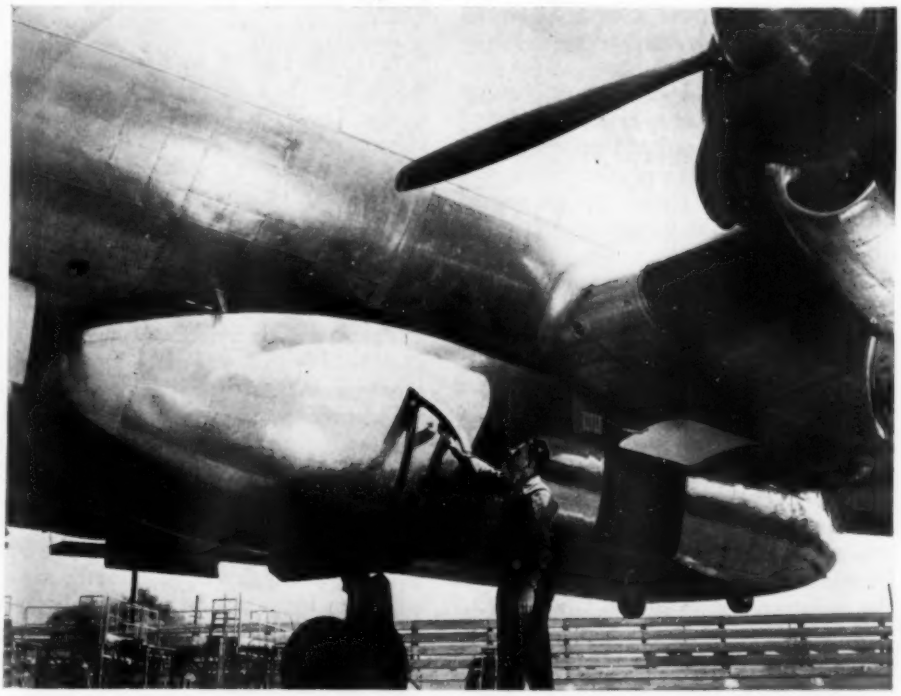
Original GCA specifications called for equipment that would bring the airplane safely down to 150 feet above the airport, but it can do better than that. The elevation beam used is accurate to six feet, while the azimuth beam is correct within 20 feet.

With his safety hinging on the orders received from the ground, the pilot has to understand clearly his orders. Strict and precise language is used by the pilot and the ground station, including such familiar air terms as "ROGER" for "Your message is received and understood," and "WILCO" for "Your message is received, understood and will be complied with."

To guide a pilot in, the orders are "Steer . . . . " followed by "right" or "left" and a magnetic heading, while altitudes are simply sent as "Fly at . . . . feet." With radar eyes to follow the plane, the ground station needs only these simple directions to bring a pilot down safely under "ceiling zero."

Basic GCA equipment was developed at the government-directed and supported radiation laboratory on the campus of the Massachusetts Institute of Technology, and this type of installation has been widely tested by the Navy, Army and the Civil Aeronautics Administration.

Science News Letter, April 27, 1946



HEAVY LOAD—With a loaded Speedpak firmly attached to its fuselage, a Lockheed Constellation is given final check by a mechanic prior to flight. Water-tight sealing on the joint between the Speedpak and the Constellation fuselage prevents seepage of moisture in flight. A waterproof tarpaulin gives additional protection for the baggage compartment.

AERONAUTICS

Four-Ton Cargo Container For 1,500-Mile Flights

➤ SLEEK, streamlined all-metal cargo containers, that fit snugly to the undersides of the bodies of giant Constellation airliners and hold four tons of baggage each, have been developed and tested by the Lockheed Aircraft Corporation, builders of the Constellation. The detachable container, called a Speedpak, can be attached to the belly of the fuselage in two minutes, or removed in the same brief time.

The giant transport, with the loaded Speedpak attached, can be used for flights up to 1,500 miles. Its speed is decreased by only about 10 miles an hour. The plane's flight characteristics are not impaired. An important feature of the Speedpak is the ease with which ground

attendants can load and unload passenger baggage, thus decreasing long waits at airports. A built-in electric hoist instantly lowers the Speedpak to convenient loading height, and as quickly raises it into position to be locked for flight.

Science News Letter, April 27, 1946

MEDICINE

New Health Leads

Better treatment of filariasis and schistosomiasis and new knowledge of antimony are being gained by cooperative research.

➤ NEW LEADS to better treatment of filariasis and schistosomiasis, tropical diseases encountered by our troops in the Pacific theater of the war, and new knowledge of antimony, a chemical with both healing and poisoning properties, are being gained by cooperative research at the National Institute of Health and the Carnegie Institution of Washington.

Results to date of these studies, started during the war and still continuing, were reported by Dr. Frederick J. Brady, of the National Institute of Health, at a meeting of the Washington Philosophical Society.

The studies started with a search for better medicines to treat these two tropical diseases. One of them, filariasis, sometimes develops into the much dreaded elephantiasis.

In this search, 55 chemical compounds were tested. Many of these were new, some were covered by German patents and others had been previously known and used. Of the entire group, four were found more promising as remedies than fuadin, the antimony compound generally used to treat schistosomiasis. However, the scientists found that any trivalent antimony compound was effective in treating these tropical diseases.

The antimony compounds have two effects on the parasitic worms that cause filariasis: 1. They cause the microscopic worm embryos to disappear from the blood stream; 2. They sterilize the adult female worms which remain in the heart of the infected animal.

This has a bearing on treatment of the disease because hitherto scientists have held that treatment of filariasis in humans would bring on elephantiasis much faster than it would develop without treatment. According to this theory the antimony compound killed the female adult worms and the dead and dying worms in the lymph nodes caused the grotesque and disabling swellings know as elephantiasis. If the adult female worms are sterilized but not killed by the treatment, then the treatment should be effective in checking the disease and preventing elephantiasis.

The action of antimony, though long used in medicine and familiar to the layman in the compound, tartar emetic, has never been fully known. Using antimony 124, a radioactive form of the metal made with the cyclotron at the Carnegie Institution, the scientists have gained new knowledge about this useful but poisonous chemical.

Tartar emetic, made with radioactive antimony, has been given to rats, dogs and men. It leaves the blood stream very rapidly and, in dogs, almost half of it is concentrated in the liver.

The thyroid gland, much to the scientists' surprise, also accumulates a large quantity of the antimony. Relatively small amounts stay in the lymph nodes and skin.

The liver, it was discovered, changes the tartar emetic into a new antimony compound. This, rather than the tartar emetic, may be what is effective in permanently sterilizing adult female worms and killing off the embryonic forms in the blood stream.

Whether this new compound has this remedial effect is not yet definitely known. The scientists do know now that the new compound is soluble in water, is less poisonous than tartar emetic and is excreted from the body faster than tartar emetic. They hope soon to be able to identify the new compound chemically.

One atom bomb research by-product will be to give more information about the action of antimony in the body, Dr. Brady said. Radioactive antimony made by cyclotron bombardment is not powerful enough for study by the tissue autographing technique.

This is a method for exposing photographic plates to radiation from radioactive elements in microscopic sections of body tissues. Examination of the sections shows the very cells of the body in which the radioactive chemical has been deposited.

When radioactive antimony becomes available from the pile used for uranium fission in atom bomb production, this technique can be used. Scientists will then know which cells of the liver and thyroid, for example, accumulate antimony and from that may learn more of what happens to it in the body or what it does in the body to poison or cure.

More knowledge of antimony and its use for curing schistosomiasis and filariasis is also expected from studies like those that developed BAL, the British anti-lewisite chemical that became a remedy for arsenic and mercury poisoning. BAL itself may be used in this phase of the work which will involve study of body enzymes. Arsenic poisons by tying up sulfhydryl groups in enzymes and BAL saves the victim by overcoming this chemical linkage. Antimony may similarly act through body enzymes.

A remedy for antimony poisoning, similar to BAL for arsenic poisoning, could then be developed, or BAL itself might prove useful. The importance of this lies in the fact that doctors must give antimony in close to poisoning doses to treat schistosomiasis effectively.

Science News Letter, April 27, 1946

CHEMISTRY

Solid Nylon Sheeting Suitable for Handbags

➤ NYLON LINES of hoseless women throughout the nation seem to mean little to the Du Pont Company; they have announced the successful development of a nylon sheeting suitable for wallets, brief cases, handbags, seat covers and other articles customarily made of leather. It raises the question: will a nylon handbag make a contented woman if her legs are still nylonless?

The new solid nylon sheeting is tough and durable in leather-like applications, can be made in any thickness and in various colors, and can be run through embossing rolls to give it any grain or other finish. It is made by the simple process of forcing the soft plastic material through a slot on a special machine into one continuous strip. Perhaps before the nylon sheeting is available to the trade, nylon stockings will be plentiful, because the new sheeting still faces production problems, and manufacturing facilities must be constructed.

Science News Letter, April 27, 1946

Hollow-stemmed *grasses* are able to support a heavy head of grain due to tough, elastic fibers, and the sheathing base of leaves.

MEDICINE

Malaria Cure Announced

New drug, SN13276, permanently clears up the disease in white patients. Taken only once a week, it makes suppression in communities practicable.

➤ A POSITIVE cure for malaria exists. It has been tested sufficiently to prove that it will permanently clear up the worst Southwest-Pacific type vivax malaria cases in white patients. Its value as a cure for malaria in Negroes, Chinese and other dark-skinned peoples must be further tested before it can be confidently used for their treatment.

This announcement was made by Dr. James A. Shannon, director of the Squibb Institute for Medical Research, New Brunswick, N. J., at the close of a special symposium on antimalarial drugs held in connection with the meeting of the American Chemical Society. During the war Dr. Shannon was chairman of the panel for clinical testing of antimalarial agents of the Board for Coordinated Studies, with headquarters in Washington, D. C.

The new drug, which was synthesized only during the past year, is still designated only by a number, SN13276. It is chemically related to a previously known drug, pamaquin, also called plasmochin in Germany. This compound, first made about 20 years ago, had definite curative properties but it could not be used because it was too poisonous to the patients. In particular, it caused severe anemia in the dark-skinned races by dissolving their red blood corpuscles. The new malaria cure, whose molecular structure resembles that of pamaquin, but with modifications, is more effective against the malaria parasite, less toxic to human beings.

Considerably more research needs to be done, Dr. Shannon emphasized, before the new drug can be released for general medical use. Of special importance is the need to make sure it will not have bad effects on Negroes, who are among the most afflicted groups in this country. Important, too, is continued chemical search for related but still better drugs. These researches are at present badly slowed down because the Office of Scientific Research and Development, which supported the work during the war, is closing down as of July 1, and no new agencies to continue the researches have yet been provided for. Legislation that would help was introduced many months ago, but Congress has not yet acted on it.

Before the new curative drug had been developed, the wartime research teams that tackled the malaria problems had made notable contributions, Dr. Shannon stated. Before the end of 1943 they had rounded up information that showed synthetic atabrin to be superior to natural quinine as a malaria suppressant, and had also made possible the large-scale use of totaquine from cinchona bark, which was the only antimalarial drug available for civilian use during the war.

A second and more important contribution was the development of new synthetics better than atabrine, which would effectively suppress malaria even if they could not cure it. Two of these, chloroquin and oxychloroquin, can be taken in doses as much as 30 to 50 times the quantity needed to suppress malaria without causing distress to the patient. They also do not cause the skin discoloration that atabrin does. This makes it possible to keep down malaria by giving doses only once a week instead of once a day, as is necessary with atabrin.

A once-a-week regimen, Dr. Shannon pointed out, makes suppression of malaria in whole communities practicable, which is not the case with a drug that has to be swallowed once a day.

New Malaria Drug

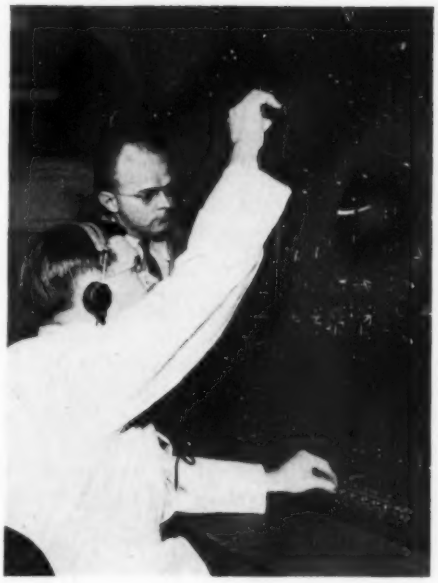
➤ EFFECTIVE antimalaria results may also come from a new group of synthetic chemical compounds known as the alpha-aminocresols, which were introduced to members of the American Chemical Society at their meeting in Atlantic City by a research team led by J. H. Burckhalter of Parke, Davis and Company.

One compound in the group, tried on bird malaria in young chicks, has shown itself to be 75 times more effective than quinine, Mr. Burckhalter reported. Chicks usually take the place of guinea pigs in preliminary experiments on antimalarial drugs, because while bird malaria is not identical with the disease in man, it is enough like the human malarias to enable scientists to get at least an approximate range on new weapons in this warfare.

More than 2,000 different chemicals have been tested for possible use against malaria during the past 10 years in his laboratory, the speaker stated. The alpha-aminocresol group has shown considerable promise, and more than 100 compounds belonging to it have already been tested.

The chemists started with the simpler forms, having the least effectiveness, and proceeded to synthesize increasingly complex ones. One of these complex, large-moleculed compounds gave the startlingly favorable results. It makes the necessary differentiation between the malaria germ and its victim, killing the former without poisoning the latter. It also has the desirable quality of not staining the skin, as atabrin does.

Science News Letter, April 27, 1946



FLIGHT TEST—This portable flight engineer trainer duplicates the flight engineer's station in the Lockheed Constellation transport and enables student engineers to familiarize themselves with all aspects of their station without resorting to costly flight tests. The ground unit is also valuable in acquainting other crew members with the flight engineer's duties. Lighting effects and a loudspeaker reproduce the visual auditory aspects of flight.

Vegetable ivory is one of the best materials for buttons; it comes from the nuts of the jarina tree of the Amazon country which when ripe become hard as ivory and possess a similar durability.

RADIO

Radar Developments To Be Told at Meeting

➤ DISCOVERIES in radar, radio wave propagation, and new radio apparatus developed during the war will be reported at meetings to be attended by radio scientists May 2 to 4 in Washington, D. C.

At these first postwar meetings of the American Section of the International Scientific Radio Union and the Washington Section of the Institute of Radio Engineers one session will be devoted to technical aspects of radar, while a day's time will be spent on the way in which radio waves travel in the upper atmosphere. The meetings will be under the chairmanship of Dr. J. H. Dellinger, chief of the National Bureau of Standards' Radio Section, who headed the Inter-Service Radio Propagation Laboratories during the war.

Science News Letter, April 27, 1946

BIOCHEMISTRY

Plant Growth Regulators In Biological Warfare

➤ A HINT that 2,4-D or some close relatives of this new weed killer might have been used as agents of biological warfare appears in a report in *Science* (April 19).

During the war extensive tests on the use of these substances, called plant growth regulators, were conducted by the Special Projects Division of the Chemical Warfare Service at Camp Detrick, Md., the report states. Such a statement, coming from this division where other biological warfare research was conducted, obviously implies that the use of these substances for destruction of enemy crops was at least considered.

The report gives further evidence of the peacetime benefits to be expected from biological and chemical warfare studies as well as of the wide range of scientific defenses needed in war.

Over 1,000 compounds were prepared and tested, the Special Projects Division now reports. The tests included effects on germinating seeds and on the growing plants when the compounds were applied to the leaves. Studies of methods of using the compounds showed that a spray was the best.

Originally the scientists thought they might find compounds that were specific for certain plant crops. The advantages of this in warfare are obvious. Against an enemy whose staple food crop was rice, a rice-specific compound, if found, would be used. Against other nations a wheat-specific or a rye-specific compound might be useful.

Compound-crop specificity was found only to a limited extent, the report states. In general, the compounds were more poisonous to broadleaf plants than to grasses.

One group of compounds was found which was more poisonous to cereals or grain crops such as rice, wheat, and rye, than to broadleaf plants. British scientists also found this true. The compounds are carbamic acid derivatives.

Only one compound specific for broadleaf plants was found. This one and its derivatives were very damaging to Irish potatoes. It is 2, 4, 5-trichlorophenoxyacetic acid, or 2, 4, 5-T for short.

Plant growth regulators or hormones, such as 2,4-D and 2,4,5-T act by stimulating abnormal growth followed by death of the plant. They are effective in very minute quantities.

Results reported so far, remarkable as they have been, are not the whole story but "only the beginning," Dr. E. M. Hildebrand, of the Food Machinery Corp., Dunedin, Fla., states in another report on the weed killers appearing in the same issue of *Science*.

Science News Letter, April 27, 1946

CHEMISTRY

Cousin of DDT Reported As More Effective

➤ DFDT, a chemical cousin of DDT, promises to be even more effective in man's chemical warfare against insects, Prof. H. L. Bradlow of the University of Kansas reported at the American Chemical Society meeting. In this compound, whose full chemical name is difluor-diphenyl-trichloro-ethane, fluorine atoms are substituted for two of the five chlorine atoms of DDT.

In identical tests on caged insects, DDT killed 90% to 95%, while DFDT killed them all. It also lasts longer when used as a soil insecticide. It is less toxic to warm-blooded animals—an advantage when used about the home and in the barn.

First information about DFDT was obtained from scattered German references. Before long, Prof. Bradlow had succeeded in producing it in his own laboratory. At present, he stated, it is somewhat more expensive than DDT.

"By further modification of the basic DDT structure," he added, "we are hopeful of producing even more potent compounds."

Science News Letter, April 27, 1946

IN SCIEN

GENETICS

Heredity Units Act as Models for New Molecules

➤ WHEN WE SPEAK of a boy as "an absolute copy of his father," we have scientific warrant for doing so. For the genes, or invisible hereditary units, which he received from his father have acted as models for the chemical construction of every molecule of living substance in his body, as a pattern or templet serves as the model for a mechanic turning out identical piece after piece on his lathe or workbench.

This picture of the function of genes was presented to the American Philosophical Society by Prof. G. W. Beadle of Stanford University, in the course of the annual Penrose Memorial Lecture.

Studies of the sub-units in the construction of living things taught us that the one thing that really distinguishes them from non-living things is their power of self-duplication, Prof. Beadle stated. First we learned that cells can produce new cells, each a close copy of the original; though it may later become modified for special functions differing from that of its parent cell. Then we learned that units much smaller than cells—genes and virus particles—possess similar powers of self-duplication.

In the growth of the organism from its original single cell, genes apparently serve as copies for most if not all protein or protein-containing molecules, Prof. Beadle told his audience. Such molecules may later become regular structural units in the new organism's body, or they may turn into such specialized things as the enzymes that chemically control such important functions as respiration and nutrition, or the antigens that combat bacterial poisoning. Since enzymes, antigens and similar key compounds influence the whole course of life, the genes, operating through them, exercise a mighty control over all organisms, from minute one-celled forms up to whales and redwood trees.

"There appear to be no obvious reasons," said Prof. Beadle in conclusion, "for believing that genes have any function other than that of serving as templets for the construction of complex protein molecules."

Science News Letter, April 27, 1946

NCE FIELDS

NUTRITION

B_6 Needed to Utilize Protein for Good Health

➤ WITHOUT an adequate supply of pyridoxine, also known as vitamin B_6, the animal body cannot utilize proteins which are indispensable to good health, University of California experiments show.

The studies show that a high protein diet, which is often prescribed to build the body's resistance to disease, may be useless unless it accompanies a high intake of pyridoxine to enable the body to assimilate the protein.

In experiments with animals it has been shown that tryptophane, an indispensable amino acid found in protein, is not utilized by the body but is excreted when there is either a severe or moderate deficiency of the vitamin.

An extreme deficiency of pyridoxine is known to cause convulsions and severe anemia in animals. Feeding of tryptophane to the severely deficient animals aggravated these symptoms and also produced nausea and muscular weakness.

Even in moderately deficient animals the same symptoms were produced, though after a longer period of time. Animals fed an adequate supply of pyridoxine were able to assimilate tryptophane, and showed no ill effects.

The experiments were conducted by Dr. Samuel Lepkovsky, Dr. Agnes Fay Morgan, and Helen E. Axelrod.

Science News Letter, April 27, 1946

PHYSICS

Peacetime Atomic Plant Is Obvious Development

➤ MOST SCIENTISTS not in the confidence of the Manhattan Engineer (Gen. Groves and the atomic bomb outfit) must have assumed that under the cloak of secrecy an experimental plant for the peacetime development of atomic energy had been underway for many months.

It is nine months since the first atomic bomb was exploded and the Smyth report was written. That should have been long enough to give birth to the rather obvious pilot plant that Gen. Groves is reported to have told Sen. McKellar (D. Tenn.), is only now being begun.

Power production in competition with fuels and water power is the least important application of atomic energy.

The atomic pile planned at Oak Ridge, Tenn., can be a factory for radioactive atom varieties, called isotopes, that, used as tracers in chemical, biological and medical experiments, may very well explain the way the green leaf uses sunshine, the cause of cancer and a host of other diseases.

Use of these radioelements has been likened in importance to the discovery of the microscope.

Most obvious application of atomic power is to the propulsion of large naval craft. The Navy would be willing to pay almost any price for a ship that would not have to refuel for many months, and large ships could afford to carry the heavy weight of the protective materials blanking out powerful radiations given off by the atom splitting in atomic power plants. It is surprising that the Navy is not hard at work on this possibility. Even if the Manhattan District is in the Army it should be willing to cooperate.

Less secrecy would allow the public to know whether the immense possibilities of atomic energy are being developed as fast as they could be.

Science News Letter, April 27, 1946

RADIO

Peacetime Uses for Panoramic Screen

➤ A PANORAMIC SCREEN that shows all radio signals received on a wave band at one time will find many important peacetime uses after playing an important role in the war, according to its inventor, Dr. Marcel Wallace, president of the Panoramic Radio Corporation in New York.

Dr. Wallace said the panoramic technique can be used for all-weather flying and ship handling, prevention of sea and air collisions and a multitude of other navigational and communication applications.

He described panoramic technique as being diametrically opposed to normal radio reception. Instead of blocking out all but one signal, the panoramic technique scans an entire wave band and reports all signals simultaneously on the panoramic screen, he explained.

Invented before the war, the new system of radio reception was used by the armed forces to jam enemy radar, monitor enemy broadcasts and locate off-frequency transmissions, the inventor disclosed.

Science News Letter, April 27, 1946

PHYSICS

X-ray for Cancer Without Radiation Sickness

➤ EFFECTIVE penetrating X-ray treatments for cancer and other ills without the patient suffering radiation sickness is possible through the use of a 20,000,000 volt betatron "atom smasher", Dr. D. W. Kerst, professor of physics of the University of Illinois, declared in delivering at the Ohio State University the first of his national Sigma Xi lectures.

With ordinary X-ray machines the distribution of the radiation is different, whereas Dr. Kerst declared with cross-firing with betatron-induced X-rays it would not be necessary to curtail an X-ray treatment because of radiation sickness produced in a patient.

Dr. Kerst, who is inventor of the betatron, said construction of an atom-smashing betatron of 250,000,000 electron volts would make possible the production of pairs of mesons, atomic particles created hitherto only by cosmic rays from outer space.

A 100,000,000 electron volt betatron at Schenectady, N. Y., has already been used to produce artificially single mesons, but Dr. Kerst explained that if both positive and negative mesons in pairs could be manufactured there would be important opportunities of further exploration of atomic mysteries.

Development of the betatron during the war, Dr. Kerst explained, was concentrated upon types that could take radiographic photographs through more than a foot thickness of steel in order to detect flaws in armor plate and large machinery parts. Using a fast technique, pictures have been taken through 20 inches of steel in 18 minues.

Science News Letter, April 27, 1946

CHEMISTRY

Liquid Oxygen Useful At High Altitudes

➤ LIQUID OXYGEN, part of the fuel system of the Nazis' V-2 rocket-bombs, was proposed for use in airplanes by Dr. H. Grayson-Smith of the University of Toronto at the American Chemical Society. But it is for the use of the passenger at high altitudes rather than for the engines. Bottles of the liquid breath of life, together with apparatus for restoring it to a gaseous state, can be substituted for the thick-walled tanks of compressed oxygen now in use, with considerable savings in weight, he declared.

Science News Letter, April 27, 1946

ASTRONOMY

Venus Still Brightening

Easily seen during May evenings are all of the planets that are ever visible to the naked eye, with the exception of Mercury. Partial eclipse visible in South Pacific.

By JAMES STOKLEY

▶ THE BRILLIANT display of planets is still with us, for during May evenings every one that is ever visible to the naked eye, with the exception of elusive Mercury, is easily seen. All four are shown on the accompanying maps, in which is depicted the sky at 10:00 p.m. on May 1, and 9:00 p.m. in the middle of the month.

Venus, brightest of the quartet, barely gets on the map, and is shown on the horizon in the west, in the constellation of Taurus, the bull. Most of this figure, by the time for which the maps are drawn, is out of sight. At sunset, however, Venus is about 20 degrees above the horizon, so it is easily seen as the sky darkens. Its magnitude, on the astronomer's scale, is minus 3.3.

The second most brilliant planet at present (which Venus exceeds about three and two-thirds times) is Jupiter, high in the south in the constellation of Virgo, the Virgin, close to the star Spica. Jupiter's magnitude is minus 1.9.

Saturn Is Third

Saturn, most distant naked-eye planet, is toward the west, in Gemini, the twins, where it has been for recent months. Ranking third in order of present brightness, it is of magnitude 0.4, or about an eighth as bright as Jupiter. This is about two and a quarter times as bright as the fourth and faintest of our planets, which is Mars. It has now moved from the figure of Gemini, where it stood during the winter and early spring, and is sojourning in the next-door constellation of Cancer, the crab.

Of the stars (which, unlike the planets, are distant suns, shining with their own light) now visible, the brightest is Vega, in lyra, the lyre, seen in the northeast. It is a little brighter than Saturn. Then comes Capella, in Auriga, the charioteer, in the northwest and rather low, Arcturus, in Bootes, the bear driver, is high in the south. Next comes Procyon, in Canis Minor, low in the west, and then Spica, in Virgo, the virgin, already mentioned because of the proximity of Jupiter.

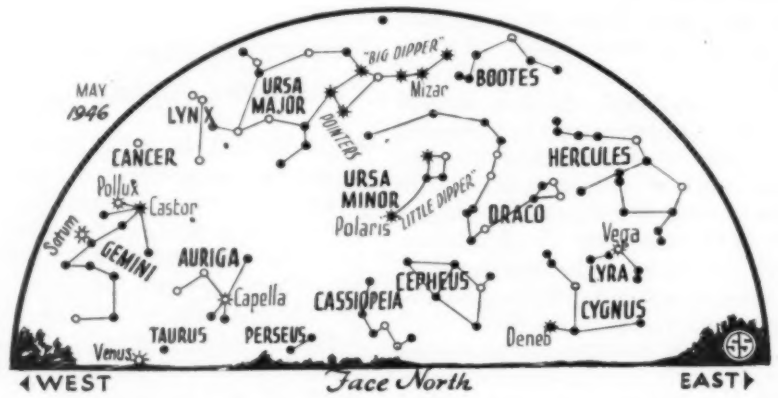
Low in the northeast, Scorpius, the scorpion, can be seen partly visible above the horizon, and in it is Antares, very red in color. Later in the night, as in the evenings of summer, it is in a better position, and its brilliance can better be appreciated. The same thing is true of Cygnus, the swan, just appearing in the northeast, and in which Deneb shines.

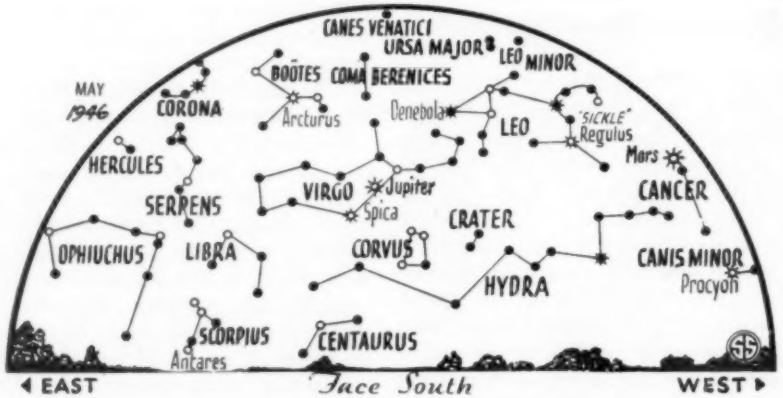
Regulus, in Leo, the lion, is in a good position, high in the southwestern sky. Directly west, one of the few typical constellations of the winter evening still visible, is the group of stars marking Gemini, the twins. Pollux is the brightest star.

Though it contains no stars of the first magnitude, the Great Dipper, in Ursa Major, the great bear, is perhaps the best known of all star groups. At this time of year, even though it is upside down, it is in its best evening position, high in the north. The two stars toward the west, forming part of the dipper's bowl, are the pointers, which indicate the direction of Polaris, the pole star, below. Polaris, in turn, is at the end of the handle of the little dipper. Winding around it is the long and snaky Draco, the dragon.

During May, the sun continues to move farther and farther north, approaching its maximum in June, at the beginning of summer. On May 30, the moon will come partially between the sun and earth, producing a partial solar eclipse, but few people will see it, as the region of visibility is in the South Pacific, between New Zealand and the southern part of South America. Except for a few Pacific islands, the only land where it will be visible is Chile, and there it will begin just before the sun sets, partially eclipsed. In mid-Pacific, where it is at a maximum, about 89% of the sun's diameter will be hidden.

Though most people probably picture an astronomer at work as a man looking





☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

through a telescope, a visit to a great observatory will reveal relatively few persons at such a task. One is more apt to find the astronomer examining a photographic plate, for most of modern astronomy is done by photography. This has two advantages. First of all, the plate is a permanent record that can be studied at leisure. But even more important is the fact that it will soak up light with long exposures. It is therefore possible to photograph objects like faint nebulae, that cannot be seen even when looking through the biggest instruments. Again, with properly sensitized plates, exposures may be made with ultraviolet or infrared rays, which cannot be detected by the human eye.

Electronic Techniques

Now, as a result of wartime electronic developments, it is likely that electron tubes, oscilloscopes and other instruments that one expects to find in an electrical laboratory will more and more invade the observatory. As a matter of fact, even before the war astronomers had begun to use several electronic techniques. To measure brightness of stars they used the electric eye, or photocell, attached to a telescope. This is an electronic tube in which the electrons are knocked out of a sensitive surface by light. The more light, the greater the number of electrons. Thus, by measuring the resultant electrical current, which is a flow of electrons, the amount of light from the star could be determined. Sometimes photocells are also used to study photographic plates, particularly those of the spectra of stars, where dark lines indicate certain elements, under various conditions. Important to know are such data as the relative intensity of different lines, or whether a line is sharply defined or gradually fades out on each side.

With the microphotometer, a spectrum plate is moved past a narrow slit, parallel to the lines. A light shines through the slit, to a photocell beyond, and as the dark lines go by the current from it is reduced. This varying current may be made to write its own record, a curve with valleys and peaks which show clearly the characteristics of the lines in the spectrum plate.

Television, too, may become an adjunct of astronomy. Just before the war experiments showed that the sun's corona or outermost layer, formerly visible only at the time of a total eclipse, could be observed at other times with a television method. Perhaps television camera tubes may be made which are even more sensitive to light than the best photographic plate, and these may be employed in telescopes in their place. With other electronic tubes to amplify the faint currents, stars and nebulae far fainter than we can photograph today with the biggest instruments may be studied. If this is done, it may be possible that a telescope of only moderate size will do what the 100-inch reflector at Mt. Wilson, or the new 200-inch at Mt. Palomar, will do by methods which are conventional today. But the same improvements should also make those telescopes even more potent—able to equal the work of ones far bigger than any that have yet been proposed.

Then there is the possibility of using radar in astronomy, as suggested by the success of the Signal Corps in getting reflections of radio waves from the moon. This would give immediately the moon's distance. To obtain it otherwise requires photographs made at different parts of the world, and their careful measurement and comparison. The same method might also be used for the measurement of distances of the planets, but the problem in that case is much more severe. While the moon's average distance is of the order of 240,000 miles, Venus, which comes nearer than any other planet, reaches a minimum distance of 26,000,000 miles. The strength of a radar echo varies not with the distance of the object which sends back the reflection, but with its fourth power. (This is the distance times the distance, times the distance, times the distance.) Thus, while Venus, at her closest, is only 108 times as far as the moon, the echo would be reduced by a factor of the fourth power of 108, which is more than 136,000,000!

Still more unlikely is the possibility of charting the heights of lunar and planetary features by radar. The radar beam used in the army experiments was several times the diameter of the moon at the distance of our satellite. To be useful in measuring height of lunar mountains (which can, by the way, be measured accurately now by other methods) the beam would have to be of the order of a mile or less in diameter at that distance. In the case of Venus, which is continually covered with clouds, such height-finding methods would be very useful, but the problem of getting a beam a mile in diameter at 26,000,000 miles or more is far more difficult—indeed, with present-day knowledge it seems to be well beyond the bounds of practicability.

Celestial Time Table for May

May	EST	
1	8:16 a.m.	New moon
2	1:00 a.m.	Moon nearest, distance 222,500 miles
	9:30 p.m.	Moon passes Venus
4	early a.m.	Meteors of eta Aquarid shower visible
6	12:02 a.m.	Moon passes Saturn
7	5.04 a.m.	Moon passes Mars
8	12:13 a.m.	Moon in first quarter
12	7:40 p.m.	Moon passes Jupiter
15	9:52 p.m.	Full moon
16	2:00 p.m.	Moon farthest, distance 252,400 miles
23	11:02 p.m.	Moon in last quarter
30	11:00 a.m.	Moon nearest, distance 222,100 miles
	4:00 p.m.	New moon, partial eclipse of sun visible in South Pacific

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, April 27, 1946

GENERAL SCIENCE

80-Year-Old Soviet Scientist Honored

➤ SOVIET agricultural scientists are honoring Academician Dmitri Pryanishnikov, now 80, who has spent 60 years in agricultural chemical researches, publishing over 400 scientific papers. His plan for crop rotation and use of industrial fertilizers, such as saltpeter and ammonium nitrate, combined with peat, industrial and farm wastes are credited with increasing crop yields and fertility of fields.

Science News Letter, April 27, 1946

Approximately 90% of the casualties due to *lightning* occur in rural districts.

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Carnations were popular in Europe during past centuries because of their beauty and also because they were thought to have healing properties.

The African *chameleon* can keep one eye focussed on a fly ahead of him that he is stalking, while he turns the other to observe a potential enemy off to one side.

American *chemicals* are now shipped to practically every important country, particularly industrial compounds, refrigerants, insecticides, fertilizers, paints, plastics and medicinals.

German bread, coated with a 50% water emulsion of polyvinyl acetate containing various proportions of chalk, talc, and lithopene, showed only slight signs of interior mold growth after eight months.

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GENERAL SCIENCE

International Studies

Large-scale laboratories for astronomy, health, food, marine biology and nuclear energy as part of UNESCO program urged by Dr. Shapley.

➤ INTERNATIONAL, large-scale scientific institutions for research and development in various fields were proposed by Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service.

Dr. Shapley discussed the program of the United Nations Educational, Scientific and Cultural Organization as a guest of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

Calling on UNESCO to consider the possibilities of establishing international centers for scientific studies, Dr. Shapley suggested large-scale laboratories for astronomy, health, food, marine biology and nuclear energy.

He declared that the plutonium atom fissions just the same way in whatever nation it happens to be located, and reported that astronomers continued to exchange data with Nazi observers during the war.

"Whenever the military men and the political powers that be don't interfere, scientists can get togther despite barriers of language, space and different government," Dr. Shapley said.

Referring to UNESCO, he declared, "There has been good cooperation in many scientific fields in the past, but we are on the threshold of much greater cooperation."

The Harvard astronomer urged the UNESCO Preparatory Commission to consider the establishment of international science centers such as the "Copernician Memorial Observatory," for which he first outlined plans in 1944.

"Equipment for modest researches and for instruction should of course be maintained in all countries, but great observatories are expensive, and their locations should be carefully chosen," he pointed out.

He reported that the proposed international observatory plans had been heartily endorsed by astronomers of many countries at the International Astronomical Union meetings in Copenhagen, Denmark, several weeks ago.

For medical research, he suggested a "Pasteur International Health Research Institute," while an "International Center for New Food Plants" would have experiment stations strategically located throughout the world.

Dr. Shapley said an "International Marine Biological Station" might be modeled on the one at Naples, Italy, and there should be an "International Center for the Study of Nuclear Energy."

"If a million dollars a year could be spent by UNESCO in building up these international enterprises, and within a few years three or four million dollars a year be spent in maintaining their useful and ever expanding international services," he declared, "the future of UNESCO as a great contributor to world peace would be assured."

Science News Letter, April 27, 1946

ENGINEERING

Air-Conditioner For High-Speed Planes

➤ YESTERDAY our fighting pilots flew their planes at 400 miles an hour; tomorrow we shall be riding as passengers at similar speeds. Taking outside air into plane cabins at such a gait is no simple matter of using an open air-scoop, states Waldemar F. Mayer of Los Angeles, in his preamble to patent 2,398,655. At 400-mile speeds, air "rams" and becomes too hot for human comfort. He accordingly places an air-driven turbine in the throat of his air intake, and uses the power thus picked up to drive a refrigerating system which in turn cools the air.

Science News Letter, April 27, 1946

THE SCIENTIST IN ACTION by W. H. GEORGE

A SCIENTIFIC STUDY OF HIS METHODS

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ECOLOGY

NATURE RAMBLINGS

by Frank Thone

Woodland Sunshine

➤ SPRING FLOWERS in the woods are not altogether woodland flowers. We commonly think of the woods as shady places, well covered by the interlacing twigs and overlapping leaves of the tree canopy. This they are, from late spring until the leaves drop off in autumn; but during late April and through much of May, in middle and northern latitudes, the trees are either unfoliaged or at most small-leaved during the time the violets, buttercups, fawn-lilies, anemonellas, spring-beauties and other typically vernal flowers are in bloom.

During this time the forest is quite a different place from what it will be when the green canopy closes. The trees' branches do cast a thin shade, and to some extent break the full sweep of the winds; but even so, there is much less difference between conditions in the woods and in the open than there will be later.

Both the quantity and the quality of the light under the unleaved trees are different. Total sunlight is several times more intense, which means among other things that the direct warming effect on soil is much greater, with correspondingly greater stimulus of perennial plants to grow and flower. There is a higher proportion of rays of shorter wavelength, which are almost wholly cut off by the leaves, after these have had time to reach full development.

The lack of a leafy canopy also makes a considerable difference in the type of rainfall received by the forest floor. In spring, the raindrops fall through the branches to the ground, with very little interception. After the trees have spread their leafy umbrellas, light showers are intercepted partly or even altogether, and evaporated back into the air without moistening the soil at all. Only heavier rains penetrate the canopy and reach the soil.

Of very great importance, perhaps of the greatest importance, is the difference in evaporation rates between the early spring woods and the same woods later in the season. The same early sunshine warmth that encourages the flowers also speeds up transpiration losses through their leaves, and direct evaporation of water from the soil. Added to this, and boosting the effect significantly, is the freer sweep of the spring winds that carry off the water vapor thus produced. Actual instrumental measurements of evaporation rates show little difference between the forest and the open at first; but after the canopy has closed the evaporation rate in the woods drops to half that in the open, or even less.

Science News Letter, April 27, 1946

The adoption of *standard time* in the United States can be credited largely to the railroads; in 1883 more than 60 different local times used by the different railroads were resolved into the four standard times now used.

ELECTRONICS

Clearer Television Pictures Predicted

➤ THREE TIMES greater clarity and brilliance of images on a television screen are reported to result from a new coating applied inside the face of a cathode ray tube developed in Schenectady, N. Y.

An aluminum "skin" or sheath serves as a sieve to electrons but is impenetrable to light, according to General Electric Co. engineers who designed the tube. This special coating is 1,500 times thinner than a sheet of paper, but has a shiny surface reflecting light.

Coated on fluorescent powder just inside the face of the tube, the "skin" permits a beam of electrons shot from the rear of the tube to penetrate it. The reflected light is believed to be three times greater than previously possible with this type of tube.

The thin coating of aluminum is applied by evaporating it so that it condenses on a plastic surface on the fluorescent powder in the tube. The plastic is removed during the heating treatment of the tube leaving the thin coat of aluminum.

Science News Letter, April 27, 1946

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• Books of the Week •

AMERICAN MINORITY PEOPLE DURING WORLD WAR II—Edmonia White Grant—*American Missionary Assn.*, 14 p., single copies free. A bibliography of publications important to Americans concerned about race relations.

ANNUAL REPORT OF THE DIRECTOR OF THE MINT: For the Fiscal Year Ended June 30, 1945—*Government Printing Office*, 97 p., tables, 20 cents.

ARCHAEOLOGY OF THE UPPER RIO GRANDE BASIN IN SOUTHERN COLORADO AND NORTHERN NEW MEXICO—E. B. Renaud—*Univ. of Denver*, 44 p., 65 cents. Archaeological Series, Sixth paper.

ASTRONOMY—John Charles Duncan—*Harper*, 500 p., tables and illus., $4.50, 4th ed. A textbook suitable for beginning classes in astronomy; revised and brought up-to-date.

CARNEGIE INSTITUTION OF WASHINGTON, YEAR BOOK No. 44: July 1, 1944—June 30, 1945.—*Carnegie Inst.*, 196 p., tables, paper, $1; cloth, $1.50.

THE CAVENDISH LABORATORY—Alexander Wood—*Cambridge Univ. Press*, 59 p., illus., $1. A description of the foundation and development of the Cavendish under Clerk Maxwell, Rayleigh, J. J. Thomson, and Rutherford, and some of the epoch-making work done there.

THE CRIME OF IMPRISONMENT—George Bernard Shaw—*Philosophical Library*, 125 p., illus., $2. A now famous essay, written after the last war in behalf of the British Labor Research Office to revise the common system of imprisonment, is being published for the first time in book form.

THE EFFICIENT USE OF FUEL—*Chemical Publishing Co.*, 807 p., tables and illus., $8.50. The composition and properties of fuel; the theories and principles of combustion; and the equipment used in burning all types of fuel, such as coal and other solid fuels, fuel oil, and industrial gases. A textbook prepared under the direction of the Education Sub-committee of the Fuel Efficiency Committee of the British Ministry of Fuel and Power.

ELECTRONIC EQUIPMENT AND ACCESSORIES—R. C. Walker—*Chemical Publishing Co.*, 393 p., tables and illus., $6. Principles of electronics and their applications in industry.

EOCENE FAUNAS FROM THE DEPARTMENT OF BOLIVAR, COLUMBIA— Bruce L. Clark and J. Wyatt Durham—*Geological Soc. of America*, 126 p., map and illus., $1.75. The Geological Society of America, Memoir 16.

FOR A STRONGER CONGRESS—Philip S. Broughton—*Public Affairs Committee*, 32 p., illus., 10 cents. Proposals for the reform of Congress, based on the theory that the main job of Congress should be to determine policy, to authorize adequate administrative organization, and to review and control the administration of policy. Public Affairs Pamphlet No. 116.

INTRODUCTORY COLLEGE CHEMISTRY—Harry N. Holmes—*Macmillan*, 590 p., tables and diagrs., $3.75, 4th ed. A text of full college grade, yet adapted to the needs of students who have had no previous training in chemistry.

LUMINOUS TUBE LIGHTING—Henry A. Miller—*Chemical Publishing Co.*, 143 p., tables and illus., $3.50. An explanation of the underlying principles of the luminous tube, of the materials and equipment involved, and a description of each of the discharge tube light sources.

MAP OF INDIA AND BURMA—*National Geographic Society*, paper, 50 cents; linen, $1, A new ten-color map of India, Burma, and adjacent regions of Asia, delineating natural features, cities and towns, and transportation lines; the 598 political divisions of India are outlined on a special chart on the back.

THE OXFORD WAR ATLAS, vol. IV: The War in 1944—Jasper H. Stembridge—*Oxford*, maps, $1.50.

PLASTICS: The Story of an Industry—*Society of the Plastics Industry*, 36 p., illus., free. A non-technical yet comprehensive picture of the plastics industry and its many and widely differing products. Copies may be obtained from the Society of the Plastics Industry, 295 Madison Ave., New York 17.

POSTWAR PLANNING CONFERENCE FOR CONTROLLED SURVEYING AND MAPPING—*Texas Engineering Experiment Station*, 66 p., diagrs. and map, single copies, free. Bulletin of the Agricultural and Mechanical College of Texas, No. 86.

1945-1946 REPORT ON THE 27.0074-DAY CYCLE IN WASHINGTON PRECIPITATION—C. G. Abbot—*Smithsonian Inst.*, 2 p., tables, 5 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 21.

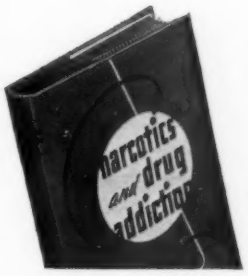
THE SOCIAL CULTURE OF THE NUNIVAK ESKIMO—Margaret Lantis—*American Philosophical Society*, 323 p., tables and illus., $2.50. Transactions of the American Philosophical Society, Vol. 35, Part 3.

SURGICAL TREATMENT OF THE NERVOUS SYSTEM—Frederic W. Bancroft and Cobb Pilcher, editors—*Lippincott*, 534 p., illus., $18. Cranial and intracranial surgery, tumors, epilepsy and cranial nerve disorders, spinal cord, autonomic nervous system, peripheral nerves.

TRIUMPH CLEAR—Lorraine Beim—*Harcourt*, 200 p., $2. A novel based on the remarkable work done at The Warm Springs Foundation among the infantile paralysis victims.

THE WORK OF THE CARNEGIE AND SUGGESTIONS FOR FUTURE SCIENTIFIC CRUISES: Oceanography—IV—*Carnegie Inst. of Washington*, 111 p., tables and illus., paper, $1.50; cloth, $2. Scientific results of Cruise VII of the Carnegie during 1928-1929 under Command of Capt. J. P. Ault. Carnegie Inst. of Washington Publication 571.

Science News Letter, April 27, 1946



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Science News Letter, April 27, 1946

⚙ *OXYGEN INDICATOR, to detect and measure tiny quantities of oxygen impurities in other gases such as carbon dioxide and hydrogen, is attached to a gas line and continuously indicates in percentages on a galvanometer oxygen impurities up to one part in a million. Its hidden vital center is a precious metal catalyst.*

Science News Letter, April 27, 1946

⚙ *RECTIFIER for converting alternating into direct current consists of a metal container inside of which a mineral element, selenium, is suspended in oil. The container is heavily tin plated and the whole unit hermetically sealed. It works efficiently in boiling water or packed in ice, it is claimed.*

Science News Letter, April 27, 1946

⚙ *PARASOL to carry on the head instead of by hand has a headgear on its center rod in place of the ordinary ornamental handle. The head-gear fits over the head like a visored open cap; a chin strap holds it firmly in place. When the parasol is closed, the head-gear is within the folded cover.*

Science News Letter, April 27, 1946

⚙ *LINE-THROWING gun, developed for the U. S. Merchant Marine, for life-saving, shoots a nylon line 400 yards from the reel shown in the picture. A projectile sometimes used is one with a mechanism for firing a carbon-dioxide cartridge which inflates a float upon impact with the water.*

Science News Letter, April 27, 1946

⚙ *TRUE AIR-SPEED indicator basically consists of three separate units, air-speed indicator, altimeter and air thermometer, combined in one inter-acting assembly. The pilot merely reads the true speed on a dial, all computations being made automatically by the instrument.*

Science News Letter, April 27, 1946

⚙ *CONCENTRATED arc lamp, whose luminescent source may be as small as 0.003 inch and 1/16 as bright as the sun, has permanent electrodes sealed into a glass bulb, filled with an inert gas. The light-source is a circular spot which forms on a specially prepared zirconium oxide cathode. It is usable for microscope-illumination, ultraviolet radiation, photographic printing and as a lenseless projector.*

Science News Letter, April 27, 1946

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Question Box

AERONAUTICS
What is a Speedpak? p. 261.

ASTRONOMY
What planets are visible during May evenings? p. 266.

CHEMISTRY
What insecticide may be more effective than DDT? p. 264.

CHEMISTRY-MEDICINE
How may toxic smoke research during the war aid medicine? p. 260.

ELECTRONICS
How are pilots "talked down" regardless of weather conditions? p. 261.

How may clearer television pictures be possible? p. 270.

GENERAL SCIENCE
What additional undertaking does Dr. Shapley urge UNESCO to consider? p. 268.

MEDICINE
What drug has been called a positive malaria cure? p. 263.
What is ACS serum? p. 259.

NUTRITION
What vitamin is needed by the animal body in order to utilize protein? p. 265.

PHYSICS
What may make X-ray treatment of cancer without radiation sickness possible? p. 265.

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